

REMARKS

The Specification and claims 8 and 14 have been amended; claims 1-3 have been cancelled; and new claims 35-44 have been added leaving claims 4-26 and 35-44 pending in the present application.

The Specification has been amended to correct errors of a clerical nature. No new matter has been added through these amendments.

Claims 4-26 have been rejected as obvious in view of Choi et al. (JP 2000058777), Zhang (US Patent 5,886,364), Chiu et al. (TW 381343), and Sun et al. (US Patent 6,150,209) in various combinations. Applicant respectfully requests reconsideration of such rejections.

Referring first to claim 4, a method of forming a capacitor structure is recited that includes forming a first electrical node, forming a layer of metallic aluminum over the first electrical node and transforming an entirety of the metallic aluminum within the layer of metallic aluminum to AlN, AlON, or AlO. Claim 4 also recites forming a second electrical node that is electrically separated from the first electrical node by at least the dielectric material. Claim 4 further recites that the first electrical node, second electrical node, and dielectric material together define at least a portion of a capacitor structure. The cited references do not teach or suggest these limitations.

Initially, an Examiner bears the burden of factually supporting any conclusion of obviousness. The Applicants need not submit any evidence of non-obviousness until the Examiner produces a *prima facie* case that the claims are obvious. Three basic criteria are required to establish a *prima facie* case. First, the prior art must suggest to those of ordinary skill in the art, "that they should make the claimed composition or device, or carry

out the claimed process.” *In re Vaeck*, 947 F.2d 488, 20 USPQ.2d 1438, 1442 (Fed. Cir. 1991). The suggestion or motivation to modify the reference or to combine reference teachings must be found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. Second, the prior art must reveal “that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success.” *Id.* Third, all of the claimed limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580, 582-3 (CCPA 1974).

For at least the reason that the cited references do not teach or suggest all of the limitations of claim 4, and that there is insufficient motivation to combine the reference teachings, a *prima facie* case of obviousness can not be established with respect to claim 4.

Applicant agrees with the Examiner that the Choi reference fails to explicitly disclose a layer of metallic aluminum being entirely transformed into AlN, AlON, or AlO. Applicant disagrees that the Zhang reference teaches or suggests a metallic aluminum layer that is entirely transformed into aluminum nitride, aluminum oxynitride or aluminum oxide. The Examiner has referred Applicant to column 5, lines 43-56 and Fig. 3B of Zhang which is reproduced in its entirety below:

Referring to FIG. 3B, nitrogen or oxygen ions, for example, nitrogen ions (N⁺) in this case, are implanted into the shaded region 37. Thus, the region 37 is nitrided and the amorphous silicon film 34 is partly converted into a light transmitting silicon nitride film. Naturally, the silicon oxide film 33 is also converted into a silicon oxynitride film and rendered light-transmittable. The aluminum film 32 also turns into a light-transmitting aluminum nitride (AlN) film. Conclusively, all the regions subjected to the ion implantation turn into light-transmitting regions. The same effects result by implanting oxygen ions in place of nitrogen ions because an aluminum oxide (e.g. Al₂O₃) film is obtained from an aluminum film. A mixture of oxygen and nitrogen may be used to form aluminum oxynitride (AlON).

Applicant disagrees that this section, when viewing the entire reference as a whole, teaches or suggests transforming an entirety of metallic aluminum layer to AlN, AlON, or AlO. Zhang specifically recites nitriding from the upper portion of the substrate represented in FIG 3. down into the substrate, with the substrate comprising at least three layers, 34, 33, and 32. Layer 34 of Zhang is a silicon layer, layer 33 of Zhang is a silicon oxide layer and layer 32, the bottom layer of Zhang, is an aluminum film. As discussed above, Zhang recites the top layer 34 is only partly converted into a light-transmitting silicon nitride film. Zhang goes on to recite that naturally, the layer directly below that layer is converted and then the layer further below the silicon dioxide layer is turned into a light-transmitting aluminum nitride film.

References must be evaluated as whole for what they would reasonably convey to a person of ordinary skill in the art. Applicant respectfully submits that nitriding through two layers to a bottom aluminum layer with the top layer only being partly nitrided would not convey to a person of ordinary skill in the semiconductor arts that the bottom aluminum layer being a layer removed from the partly nitrided top layer, was entirely transformed to AlN. As such, the cited references either alone or in combination do not teach or suggest all the elements of claim 4.

Moreover, there is no motivation to combine the Choi and Zhang references to teach the limitations of claim 4. Applicant understands that they have made this argument previously but feels the need to restate the argument in response to the Examiner's interpretation of the same.

As Applicant understands the Office action, the Examiner believes that Choi and Zhang are analogous arts and that while Zhang does not specify the forming of a capacitor

or Choi a TFT, neither rules out the possibility of forming the other device. To be perfectly clear Applicant submits that there is insufficient motivation to combine Choi and Zhang to establish a *prima facie* case of obviousness with respect to claim 4. As Applicant understands the Examiner's rejection, the motivation to combine Choi and Zhang is due to the preference in microelectronic processing of sharing as many common steps between devices to lower production costs, and forming Choi's capacitor with Zhang's TFT on the same substrate would use Zhang's process of forming AlN. However, claim 4 does not recite a method of forming a capacitor structure and TFT on the same substrate. Claim 4 recites a method of forming a capacitor structure. Applicant can find no suggestion in Choi of forming a TFT while forming its capacitor structure nor can Applicant find any suggestion in Zhang of forming a capacitor structure while forming its TFT.

For at least the reason that neither cited reference suggests the other, Applicant disagrees that it is reasonable that forming Choi's capacitor with Zhang's TFT on the same substrate will use Zhang's process of forming the AlN. Under *In re Vaeck* this type of reconstruction is improper because the Examiner's recited suggestion to make the claimed combination cannot be found in the cited references or in the knowledge generally available to one of ordinary skill in the semiconductor arts. None of the cited references recite a motivation to combine methods for constructing Choi's capacitor with methods for constructing Zhang's TFT. For at least these reasons there is insufficient motivation to combine Choi and Zhang.

For at least the reason the cited references neither teach nor suggest all the elements of claim 4 and there is insufficient motivation to combine the cited references, a *prima facie* case of obviousness cannot be established and claim 4 is allowable.

Claims 8 and 14 have been amended for clerical reasons. Entry of the same is requested.

Claims 5-26 depend from claim 4 and are allowable for at least the reasons discussed above regarding claim 4.

New claims 35-44 have been added and do not constitute new matter. For example, new claims 35-44 are supported by the Specification at for example, Figs. 1-11 and pages 9-22. New claims 35-44 are allowable for at least the reason that they recite limitations not taught or suggested by the cited references.

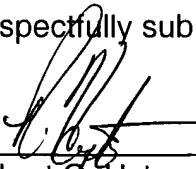
For example, new claim 35 recites forming a metallic aluminum layer over the first electrical node with the metallic aluminum layer having a thickness less than 40 Å and exposing the layer of metallic aluminum to one or both of O or N at any temperature less than 300°C to form a dielectric material comprising aluminum and one or both of O and N. The cited references neither teach nor suggest exposing a metallic aluminum layer to O and N at a temperature less than 300°C to form a dielectric material comprising aluminum and one or both of O and N. In fact the cited references recite temperatures more properly in the range of 1000°C (Zhang) or 450-600°C (Choi). As such, the temperatures recited in claim 35 are not within the bounds of the cited references nor are they taught or suggested by the cited references. For at least the reason the cited references neither teach nor suggest all the limitations of claim 35, claim 35 is allowable.

Claims 36-44 depend from claim 35 and are allowable for at least the reasons cited above regarding claim 35. Claims 4-26 and 35-44 are in immediate condition for allowance.

If any other action other than a Notice of Allowance is anticipated by the Examiner Applicant respectfully requests the Examiner phone Applicant at (509) 624-4276 between the hours of 8.00 am and 5.00 pm Pacific Standard Time, Monday-Friday.

Respectfully submitted,

Dated: 6/1/04

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